S

ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 660518
Proj. ECN

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.	4. USQ Required?	5. Date
Supplemental [] Direct Revision [x] Change ECN [] Temporary [] Standby [] Supersedure [] Cancel/Void []	T. Nuxall, CVDF, R3-86, 372-3739	[x] Yes [] No	6/1/00
	6. Project Title/No./Work Order No. SNF/W-441 Spent Nuclear Fuel Cold Vacuum Drying	7. Bldg./Sys./Fac. No. CVDF 142-K	8. Approval Designator S^NQ
	9. Document Numbers Changed by this ECN (includes sheet no. and rev.) SNF-3934, Rev. 1, SNF-3890, Rev. 1, SNF-3876, Rev. 1, SNF-3877, Rev. 1	10. Related ECN No(s). N/A	11. Related PO No. N/A

12a. Modification Work	12b. Work Package No.	12c. Modification Work Complete	12d. Restored to Original Condition (Temp. or Standby ECN only)
[] Yes (fill out Blk. 12b) [X] No (NA Blks. 12b, 12c, 12d)	N/A	N/A Design Authority/Cog. Engineer Signature & Date	N/A Design Authority/Cog. Engineer Signature & Date

13a. Description of Change

13b. Design Baseline Document? [] Yes [X] No

SC

Process Hood GOVs

Revised internal pressure acceptance criteria to "Withstands nominal 150 psig and 29" Hg Vacuum". Add GOV Seat Leakage acceptance criteria. Revised all GOV fail safe position, stroke time to "Less than 2 seconds", deleted critical characteristic insulation resistance, solenoid inrush current, solenoid holding current, and current carrying capability of contracts.

USQ Approval: CVD-00-1036 ltr 6/2/00

14a. Justification (mark one)

Criteria Change[]	Design Improvement[X]	Environmental[]	Facility Deactivation[]
As-Found[]	Facilitate Const[]	Const. Error/Omission[]	Design Error/Omission[]

14b. Justification Details

Revision required to make these CGI dedication packages consistent with there safety function.

The design verification method for SS/SC components is by independent review in accordance with EN-6-027-01. Documentation of this review is accomplished by the independent review approval signature provided on page 2 of this ECN.

15. Distribution (include name, MSIN, and no. of copies)

See distribution sheet.

RELEASE STAMP
DATE: JUN 06 2000
STA: 30
HANFORD RELEASE ID 18

ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1): 660518

16. Design Verification Required	17. Cost Impact NA				18. Schedule Impact (days)	
	ENGINEERING		CONSTRUCTION		NA	
[X] Yes	Additional	[] $	Additional	[] $	Improvement	[]
[] No	Savings	[] $	Savings	[] $	Delay	[]

19. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 13. Enter the affected document number in Block 20.

SDD/DD	[]	Seismic/Stress Analysis	[]	Tank Calibration Manual	[]
Functional Design Criteria	[]	Stress/Design Report	[]	Health Physics Procedure	[]
Operating Specification	[]	Interface Control Drawing	[]	Spares Multiple Unit Listing	[]
Criticality Specification	[]	Calibration Procedure	[]	Test Procedures/Specification	[]
Conceptual Design Report	[]	Installation Procedure	[]	Component Index	[]
Equipment Spec.	[]	Maintenance Procedure	[]	ASME Coded Item	[]
Const. Spec.	[]	Engineering Procedure	[]	Human Factor Consideration	[]
Procurement Spec.	[]	Operating Instruction	[]	Computer Software	[]
Vendor Information	[]	Operating Procedure	[]	Electric Circuit Schedule	[]
OM Manual	[]	Operational Safety Requirement	[]	ICRS Procedure	[]
FSAR/SAR	[]	IEFD Drawing	[]	Process Control Manual/Plan	[]
Safety Equipment List	[]	Cell Arrangement Drawing	[]	Process Flow Chart	[]
Radiation Work Permit	[]	Essential Material Specification	[]	Purchase Requisition	[]
Environmental Impact Statement	[]	Fac. Proc. Samp. Schedule	[]	Tickler File	[]
Environmental Report	[]	Inspection Plan	[]		[]
Environmental Permit	[]	Inventory Adjustment Request	[]		[]

20. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number Revision
NA		

21. Approvals

Signature	Date	Signature	Date
Design Authority C. Miska	6/1/00	Design Agent	
Cog. Eng. C. VanKatwijk	6/2/00	PE	
Cog. Mgr. T. Choho	6/2/00	QA	
QA ~~H. Chafin~~ R. RAMSATO	6/2/00	Safety	
Safety J. Brehm Per	6/2/00	Design	
Independent Reviewer	6/2/00	Environ.	
Other: * C. Haller	6/2/00	Other	

* Approval authorized parallel preparation of USQ screen with implrementation of ECN per NSDI-02.

DEPARTMENT OF ENERGY

Signature or a Control Number that tracks the Approval Signature

ADDITIONAL

DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	SNF-CVD	Date 6/2/00
Project Title/Work Order		EDT No. N/A
W-441,		ECN No. 660518

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
K. McCracken	S1-53	x			
B. Ramsgate	R3-86	x			
L. Price	R3-26	x			
AVS - Patricia Morrell	G1-50	x			
AI - Mike Evarts	N1-29	x			
J. Irwin	R3-86	x			
P. Beaudet	X3-25	x			
D. Cole	R3-86	x			
M. Croskrey	R3-86	x			
W. Alaconis	X3-79	x			
J. Gregory	X3-78	x			
SNF Startup Library	B2-64	x			
CVD Library (A. Artzer)	R3-86	x			
CVDF Satellite Library	X3-25	x			
T. Nuxall	R3-86	x			
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C. Van Katwijk	R3-47	x			
D. Whitworth	R3-11	x			
J. Brehm	R3-26	x			
C. Haller	X3-78	x			
G. Singh	R3-86	x			
C. Miska	R3-86	x			
B. Parker	R3-86	x			
Meier Enterprise (thru Lou Oliveros)		x			
C. Schweda	S2-45	x			

SNF-3877
Revision 2

Worcester 1" Solenoid-Actuated Gas-Operated SCHE System Valves

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

Fluor Hanford
P.O. Box 1000
Richland, Washington

SNF-3877
Revision 2
ECN 660518

Worcester 1" Solenoid-Actuated Gas-Operated SCHE System Valves

C. Van Katwijk
Fluor Hanford, Inc.

Date Published
June 2000

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

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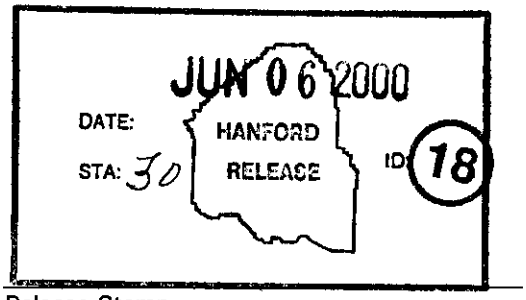
U.S. Department of Energy under Contract DE-AC06-96RL13200

Fluor Hanford
P.O. Box 1000
Richland, Washington

Barbara Walsh 6/6/00
Release Approval Date



Release Stamp

Approved for public release; further dissemination unlimited

SNF 3877
Rev. 2

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Printed in the United States of America

Total Pages: 14

RECORD OF REVISION

(1) Document Number: SNF-3877

(2) Title: WORCESTER SOLENOID-ACTUATED GAS-OPERATED SCHE SYSTEM VALVES

Change Control Record

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release	
		(5) Cog. Engr.	(6) Cog. Mgr. Date
0	(7) EDT 626251, INITIAL RELEASE		
1	ECN 653776, REVISION TO MEET SEL REV. 6.		
2 RS	ECN 660518, REVISION TO MEET INTERNAL PRESSURE ACCEPTANCE CRITERIA.	6-6-00	6-6-00

Section 1 Part Information		
Item No.: **N/A**	Manufacturer: **N/A**	Supplier: **N/A**
Mfg. Part/Model No.: **N/A**	Supplier's P/N: **N/A**	
Part Description: **N/A**		
End Use Description: **N/A**		

Section 2a Component Information			
Equipment No.: **He-GOV/SOV-1*02, 1*06 SCHe-GOV/SOV-5*12, 5*31, 5*51, 5*71**	Specification No.: **SNF-5303, Rev. 0 (W-441-P4, Rev. 3)**	Manufacturer: **Worcester Controls**	Past P.O. No.: **N/A**
Procurement and/or Model Number: **1" E 5966RTBW4 with 15I939SWM2120PBC**	Equipment Supplier (if different from manufacturer): **Olympic Tool & Engineering**		Equip. Supplier's Part No.: **N/A**
Component Description: **1" Gas-operated full-port ball valves incorporate a solenoid and limit switches as integral parts of the actuator. These valves are normally open and fail safe to the open position (GOV-1*02 and 1*06 fail closed) to provide a flow path of helium gas to the MCO under helium purge and off-normal conditions when the MCO is isolated.**			

Section 2b Commercial Availability of the Item

1. Is the Item available from a catalogue from a qualified NQA1 supplier or ISO 9000 supplier (coordinate with project CGI interface Engineer or BTR)? [ ] YES (go to #2 below) [X] NO (go to procedure step 6.3.2, proceed to dedicate Item)

   If not available from a qualified NQA1 supplier, is it available from an ISO 9000 supplier? (coordinate w/ project CGI Interface Engineer or BTR):

   [ ] YES (go to #2 below, procedure step 6.3.2, dedicate Item) [X] NO (procedure step 6.3.2, dedicate Item)

2. List of Candidate qualified suppliers or ISO 9000 suppliers: **N/A**

3. Recommended Procurement Strategy(coordinate with project CGI interface Engineer or BTR): **N/A**

Section 2c CGI Determination

CGI Determination Questions:

#1: Is the Item subject to design or specification requirements that are unique to nuclear facilities or activities?

[ ] YES (the Item is not commercial grade) [X] NO (continue)

#2: Is the Item used in applications other than nuclear facilities or activities?

[ ] NO (the item is not commercial grade) [X] YES (continue)

#3: Is the Item ordered from manufacturer/supplier on the basis of specifications set forth in the manufacturer's catalog?

[ ] NO (the item is not commercial grade) [X] YES (continue)

[X] All three criteria have been satisfied. The Item meets the definition of commercial grade.

Section 2d Reason for Dedication

The above Commercial Grade (CG) described Item is being Dedicated for use in the application cited for the following reason(s):

X	Item is being purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item is being purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Significant application.
	Item was purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Class application.
	Item was purchased from a non-ESL manufacturer supplier as CG to be used in a Safety Significant application.
	Other ('like-for-like', similar, substitution, replacement evaluation)

Section 3 Failure Effects Evaluation

A. Part/Component Safety Function:

1. **Prevent H_2 Explosion.**
2. **Remain intact and functional during any event that might threaten the valve integrity. Maintain intact pressure boundary/confinement.**
3. **Maintain critical function before and after seismic event.**

B. Part/Component Functional Mode:

Safety Function #1: [X] Active [ ] Passive
Safety Function #2: [ ] Active [X] Passive
Safety Function #3: [ ] Active [X] Passive

Active - Mechanical or Electrical change of state is required to occur for the component to perform its safety function

Passive – Change of state is not required for the component to perform its safety function

C. Host Component Safety Function (if applicable): **N/A**

1.

D. Failure Mode(s) and the effects on component or system safety function (see Worksheet 1):

1. **Electrical fault in the solenoid. Valve fails open (fail-safe), fails closed for GOV-1*02 & 1*06.**
2. **Loss of air pressure to the pneumatic actuator. Valve fails open (fail safe), fails closed for GOV-1*02 & 1*06.**
3. **Loss of control signal to solenoid. Valve fails open (fail safe), fails closed for GOV-1*02 & 1*06.**

Section 4 Environmental & Natural Phenomena Hazard Design

Environmental Qualification Required:
Yes [ ]
No [X] **Environmental Condition B**

If yes: Environmental Qualification Requirements
Limiting Environmental Conditions:
Required Safety Functions:
Qualification Period:

Natural Phenomena Hazard (NPH) Design Required:
Yes [X]
No [ ]
HNF-PRO-97 Rev. 0
W-441-P4, Rev. 3

If yes: NPH Design Requirements
Performance Category: **PC-3**
NPH Design Req'ts.: **Seismic Condition A**
Required Safety Functions: **Boundary/Confinement, Isolation, Prevent H_2 Explosion**

Section 5 Component Functional Classification

X	Safety Class (SC)		General Service (GS)		Safety Significant (SS)

If part/component classification is different from host component/system, document basis. **N/A**

Sections 6 and 7 (Reserved)

Section 8 References (for Functional Classification)

National Codes/Standards: **ASME B31.3**
Safety Analysis Report (SAR): **HNF- 3553, Rev. 0a, Annex B**
Drawings: **H-1-82161, Rev. 4, HNF-SD-SNF-SEL-002, Rev. 7**
Vendor Manual/Manufacturer/Supplier Information:**Worcester PB451-22**

Section 9 Critical Characteristics				
Critical Characteristics	Acceptance Criteria/Tolerances	Acceptance Method	ID	Function
1. Item Identification Critical Characteristics (necessary for reasonable assurance that the Item delivered is the Item specified)				
Nameplate - Manufacturer	**Worcester Controls**	1, IN	X	
Valve-Component Number-Procurement and/or Model Number	**1" E 5966RTBW4 (Per Procurement Package W-441-P4, Rev. 3, Section H, Design Data Sheet)**	1, IN	X	
Actuator-Component Number-Procurement and/or Model Number (Includes SOV)	**15I939SWM2120PBC (Per Procurement Package W-441-P4, Rev. 3, Section H, Design Data Sheet)**	1, IN	X	
Nameplate Data of Actuator (Includes SOV)	**Per Vendor Manual. To Include "R6" (Upper Right Corner)**	1, IN	X	
2. Physical Critical Characteristics (for reasonable assurance that the Item delivered is the Item specified)				
Valve Body Material	**Stainless Steel (Note 4)**	1, IN; 1, T	X	
Configuration/Mounting	**Integral Actuator/Valve Assembly. Black recessed override button**	1, IN	X	
Process Connection	**1" Butt Weld**	1, IN	X	
3. Performance Critical Characteristics (for reasonable assurance that the Item will perform its intended safety function(s))				
GOV Pressure Boundary	**Pressure Test At nominal 165 psig (Zero Leakage) Note 3**	1, T		X
Internal Pressure	**Withstands nominal 150 psig and 29" Hg Vacuum (Zero Leakage)**	1, T		X
GOV Seat Leakage	**Pressurize the upstream side of the valve seat to 165 psig (110%) and reduce to 150 psig ~~(110%)~~, soaking for 10 min. at 150 psig, then check for obvious leaks. Apply bubble leak solution on the valve seat to find leaks. Proceed to lower the pressure to 15 psig for the Sensitive Leak Test. Apply solution to valve seat area after minimum 15 minutes soak time at nominal 15 psig.** **Acc. Criteria: No Leakage-No Bubbles. Note 5**	1, T		X
GOV Fail Safe PositionGOV-5*12, 5*31, 5*51, 5*71	**Valve fails OPEN on loss of air pressure, control signal, or electrical power to the solenoid. Stroke time less than 2 seconds.**	1, T		X
GOV Fail Safe PositionGOV-1*02 & 1*06*	**Valve fails CLOSED on loss of air pressure, control signal, or electrical power to the solenoid. Stroke time less than 2 seconds.**	1, T		X
Environmental	**Note 1**			
Seismic Condition A	**Note 2**	1, T		X

4. Notes and Legend:

1. **These valves have coro-lube (nickel-acetate), acetal resin, and NEMA Enclosed Solenoids, these materials are not subject to degradation at 40°F and 60% RH or 115°F and 22% RH and are suitable for condition B Application.**
2. **Maintain critical function before and after seismic event. W-441-P4, Rev. 3, Appendix L, pages L-2 & L-4, provide a seismic testing plan for these components at a (TBD) seismic spectra. Equipment that has been shaker-table tested should not be installed in a plant (Ref. IEEE Standard 344-1984, Section 7). Consequently, the seismic test constitutes a destructive test. The industry sampling practice for destructive test is to test only one item.**
3. **Pressure test at 110% of design accident condition pressure of 150 psig.**
4. **Material verification acceptance method may be by either inspection or test.**
5. **15 psig = 15 psig or 25% of 150 psig=37.5 whichever is less (ASME V, Article 10, T-1044 and B31.1-1993, 345.8(a))**

Rev. 2: Rev'd all pages – new forms; rev'd Internal Pressure Acc. Criteria to "Withstands nominal 150 psig and 29" Hg Vacuum", GOV Seat Leakage Acc. Criteria – rev'd all, GOV Fail Safe Position rev'd Stroke Time to "Less Than 2 Seconds", Deleted CC: Insulation Resistance, Solenoid Inrush Current, Solenoid Holding Current, and Current Carrying Capability Of Contacts

Acceptance Method:

1. Special Test and Inspection
   1, IN for Inspection
   1,T for Test
2. Commercial Grade Survey
3. Source Verification
4. Vendor/Item History

Section 10 Initial Review and Approval

Approvals:

Designated Engineer: 5/30/00

Design Authority: 5/30/00

QA Engineer: 6/1/00

WORKSHEET 1

DETERMINATION OF FAILURE MECHANISMS

Section 1

Typical Failure Mechanisms	Definition	X = Applicable to Component under Evaluation X?	Indicate Failure Mode
Fracture	Separation of a solid accompanied by little or no macroscopic plastic deformation.		
Corrosion	The gradual deterioration of a material due to chemical or electrochemical reactions, such as oxidation, between the material and its environment.		
Erosion	Destruction of materials by the abrasive action of moving fluids, usually accelerated by the presence of solid particles carried with the fluid.		
Open Circuit	An electrical circuit that is unintentionally broken so that there is no complete path for current flow.		
Short Circuit	An abnormal connection by which an electrical current is connected to ground, or to some conducting body, resulting in excessive current flow.		
Blockage	Clogging of a filtering medium resulting in the inability to perform its purification function or blockage of flow.		
Seizure	Binding of a normally moving item through excessive pressure, temperature, friction, jamming.	X	**Structural Failure or Seizure of Valve/Disc**
Unacceptable Vibration	Mechanical oscillations produced are beyond the defined permissible limits due to unbalancing, poor support, or rotation at critical speeds.		
Loss of Properties	A loss of mechanical and physical properties of a material due to exposure to high temperatures, radiation exposure.		
Excess Strain	Under the action of excessive external forces the material of the part has been deformed or distorted.		
Mechanical Creep	From prolonged exposure to high temperature and stress, the object will show a slow change in its physical (shape and dimension) and mechanical characteristics		
Ductile Fracture	Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation.		

Section 2 Additional Failure Modes Applicable to the Component Under Evaluation

1. Loss of Air Pressure

Checklist 1 - Acceptance Method 1 - Special Test/Inspection Verification

SECTION 1

Item Description: **1" SCHe Solenoid Valves** System #: **13**	Equip #: **He-GOV/SOV-1*02, 1*06, SCHe-GOV/SOV-5*12, 5*31, 5*51, 5*71** Procurement and/ or Model #: **1" E 5966RTBW4 with 15I939SWM2120PBC**
Manufacturer (Address/Phone): **Worcester Controls** **P.O. Box 538** **33 Lock Dr.** **Marborough, MA 01752** **(508) 481-4800**	Supplier (Address/Phone): **Olympic Tool & Engineering** **W. 21 Sanderson Way** **Shelton, WA 98584** **(360)426-5231**

SECTION 2 CRITICAL CHARACTERISTICS TO BE VERIFIED BY METHOD 1

Insp	Test	Post-Test	
X			1. **Nameplate - Manufacturer**
X			2. **Component Number-Procurement and/or Model Number**
X			3. **Actuator-Component Number-Procurement and/or Model Number (Includes SOV)**
X			4. **Nameplate Data of Actuator (Includes SOV)**
X	X		5. **Body Material (Verification may be by either inspection or test)**
X			6. **Configuration/Mounting**
X			7. **Process Connection**
	X		8. **GOV Pressure Boundary**
	X		9. **Internal Pressure**
	X		10. **GOV Seat Leakage**
	X		11. **GOV Fail Safe Position**
	X		12. **Seismic Condition A**

SECTION 3 BY INSPECTION * See Attachment H, Table H-1 of Desk Instruction for Sampling Size; References (See Section 7)

Characteristic: **Nameplate – Manufacturer** Sample Size*: **100%**
Acceptance Criteria: **Worcester Controls** Receipt Inspection Plan / Report #:

Characteristic: **Valve Component Number-Procurement and/or Model Number** Sample Size*: **100%**
Acceptance Criteria: **1" E 5966RTBW4 (Per Procurement Package W-441-P4, Rev. 3, Section H, Design Data Sheet)**
Receipt Inspection Plan / Report #:

Characteristic: **Actuator-Component Number-Procurement and/or Model No. (Includes SOV)** Sample Size*: **100%**
Acceptance Criteria: **15I939SWM2120PBC (Per Procurement Package W-441-P4, Rev. 3, Section H, Design Data Sheet)**
Receipt Inspection Plan / Report #:

Characteristic **Nameplate Data of Actuator (Includes SOV)**	Sample Size*: **100%**
Acceptance Criteria: **Per Vendor Manual. To Include "R6" (Upper Right Corner).**	
Receipt Inspection Plan / Report #:	
Characteristic: **Process Connection**	Sample Size*: **100%**
Acceptance Criteria: **1" Buttweld**	Receipt Inspection Plan / Report #:
Characteristic: **Configuration/Mounting**	Sample Size*: **100%**
Acceptance Criteria: **Integral Actuator/Valve Assembly. Black recessed override button.** Receipt Inspection Plan / Report #:	
Characteristic: **Valve Body Material**	Sample Size*: **100%**
Acceptance Criteria: **Stainless Steel**	Receipt Inspection Plan / Report #:
Section 4 By Special Test * See Attachment H, Table H-1 of Desk Instruction for Sampling Size, References (See Section 7)	
Characteristic for Test: **GOV Pressure Boundary**	Samp Size*: [X]Normal[ ]Reduced[ ]Tightened
Acceptance Criteria: **Pressure Test at nominal 165 psig for >10 minutes; Reduce pressure to 100%, perform snoop test (No Leakage-No Bubbles)**	
Actual Test Value:	Test Plan and Report #:
Characteristic for Test: **Internal Pressure**	Samp Size*: [X]Normal[ ]Reduced[ ]Tightened
Acceptance Criteria: **Withstands nominal 150 psig and 29" Hg Vacuum (Zero Leakage)**	
Actual Test Value:	Test Plan and Report #:
Characteristic for Test: **GOV Seat Leakage**	Samp Size*: [X]Normal[ ]Reduced[ ]Tightened
Acceptance Criteria: **Pressurize the upstream side of the valve seat to 165 psig (110%) and reduce to 150 psig (110%), soaking for 10 min. at 150 psig, then check for obvious leaks. Apply bubble leak solution on the valve seat to find leaks. Proceed to lower the pressure to 15 psig for the Sensitive Leak Test. Apply solution to valve seat area after minimum 15 minutes soak time at nominal 15 psig. Acc. Criteria: No Leakage-No Bubbles**	
Actual Test Value:	Test Plan and Report #:
Characteristic for Test: **GOV Fail Safe Position GOV-5*12, 5*31, 5*51, 5*71**	Samp Size*: [X]Normal[ ]Reduced[ ]Tightened
Acceptance Criteria: **Valve fails OPEN on loss of air pressure, control signal, or electrical power to the solenoid. Stroke time less than 2 seconds.**	
Actual Test Value:	Test Plan and Report #:
Characteristic for Test: **GOV Fail Safe Position GOV-1*02 & 1*06**	Samp Size*: [X]Normal[ ]Reduced[ ]Tightened
Acceptance Criteria: **Valve fails CLOSED on loss of air pressure, control signal, or electrical power to the solenoid. Stroke time less than 2 seconds.**	
Actual Test Value:	Test Plan and Report #:
Characteristic for Test: **Seismic Condition A**	Samp Size*: **Destructively Test Only One Item**
Acceptance Criteria: **Maintain Critical Function Before and After Seismic Event**	
Actual Test Value:	Test Plan and Report #:

**If Supplier/Manufacturer or Other, Refer to CGI Checklist-2 for Support Information

Section 5 Test / Inspection Summary (Acceptance Method 1)

1. SUMMARY OF VERIFIED CRITICAL CHARACTERISTICS , THEIR VERIFICATION METHODS, AND RESULTS

ITEM DESCRIPTION: Gas Operated Full Port Ball Valves

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
Manufacturer	Worcester Controls	X		1, IN							
Valve Component No.-Proc. and/or Model No.	1" E 5966RTBW4 (Per Procurement Package W-441-P4, Rev. 3, Section H, Design Data Sheet)	X		1, IN							
Actuator P/N-Comp. No.-Proc. and/or Model No. (Includes SOV)	15I939SWM2120PBC (Per Procurement Package W-441-P4, Rev. 3, Section H, Design Data Sheets)	X		1, IN							
Nameplate Data of Actuator (Includes SOV)	Per Vendor Manual. to Include "R6" (Upper Right Corner).	X		1, IN							
Body Material	Stainless Steel	X		1, IN							
Configuration/ Mounting	Integral Actuator/Valve Assembly. Black recessed override button.	X		1, IN							
Process Connection	1" Buttweld	X		1, IN							

ITEM DESCRIPTION: Gas Operated Full Port Ball Valves - Continued

Critical Characteristics				Verification Results							
Critical Characteristics	Acceptance Criteria/Tolerances	ID	Function	Method T/IN	Procedure or RR#	Check-list ID	Number Tested	Number Failed	Verifying Organization	Printed Name Signature	Date
GOV Pressure Boundary	Pressure Test At nominal 165 psig (Zero Leakage)		X	1, T							
Internal Pressure	Withstands nominal 150 psig and 29" Hg Vacuum (Zero Leakage)		X	1, T							
GOV Seat Leakage	Pressurize the upstream side of the valve seat to 165 psig (110%) and reduce to 150 psig (110%), soaking for 10 min. at 150 psig, then check for obvious leaks. Apply bubble leak solution on the valve seat to find leaks. Proceed to lower the pressure to 15 psig for the Sensitive Leak Test. Apply solution to valve seat area after minimum 15 minutes soak time at nominal 15 psig. Acc. Criteria: No Leakage-No Bubbles		X	1, T							
GOV Fail Safe Position GOV-5*12, 5*31, 5*51, 5*71	Valve fails OPEN on loss of air pressure, control signal, or electrical power to the solenoid. Stroke time less than 2 seconds.		X	1, T							
GOV Fail Safe Position GOV-1*02 & 1*06*	Valve fails CLOSED on loss of air pressure, control signal, or electrical power to the solenoid. Stroke time less than 2 seconds.		X	1, T							
Seismic Condition A	Maintain Critical Function Before and After Seismic Event.		X	1, T							

2. DISPOSITION OF UNVERIFIED OR FAILED CRITICAL CHARACTERISTICS

Critical Characteristic	Disposition

3. Signature Indicates All Critical Characteristics Verified Satisfactory or Acceptably Dispositioned And Commercial Grade Dedication Is Satisfactory and Complete.

Testing Agency Approval:_____ Date_____

Testing Agency QA Engineer:_____ Date_____

Design Authority:_____ Date_____

QA Engineer:_____ Date_____

Section 6 Contacts / Phone Numbers		
Title	Name	Phone
Design Authority		
QA		
QC		
Cog - Engineer		
CGI Engineer	**Larry Price**	**372-8770**
Procurement Engineer		
Other		

Section 7 Supporting Documentation for This Checklist		
Initial Procurement Documents		**For Critical Characteristics**
	Drawings:	
	Manuals (specify type & number):	
	Design Calculations	
	Installation Instructions	
	Operation Instructions	
	Calibration Instructions	
	Manufacturer's Recommended Spare Parts List	
X	**Other: Vendor Specifications: Worcester PB451-22**	**All**
Procurement Documents		
	Certificate of Conformance/Compliance	
	Seismic Qualification Certificate	
	Environmental Qualification Certificate	
	Test Report (s):	
	Inspection Report (s):	
	CMTRs for ASME Pressure Retaining Materials	
	Valve Seat Leakage Report	
	Weld Records	
	Material Traceability Record	
	Other:	